ABSTRACT

Hierarchical Level-Based IP Multicasting (HLIM) is a method for the multicasting of

5   data packets from a source to a number of receivers on a network that supports both host and

network mobility. In HLIM, IP routers are assigned to hierarchical levels to become

hierarchical designated routers. The hierarchical levels also are used to define a scope region

in which multicast data packets are to be delivered. Each scope region is associated with a

unique root identifier (RID). Scope region information and root identifiers are placed into a

10   multicast address so that multicast packers of data will be distributed to routers and hosts

within the scope region. If a host (receiver or source) or sub-network moves out of the scope

region but desires to continue receiving multi-cast packets the host can request receipt of

such packets from its new parent hierarchical designated router through use of the RID and

associated binding point (BPT). In this manner, HLIM provides a shared and shortest-path

15   multicast tree without using a center point like a core or rendezvous point. HLIM supports not

only host mobility (movements of IP hosts) but also network mobility (movements of IP routers

with/without hosts). HLIM is oriented to operate in hierarchical networks, but can be also

applied to flat networks by emulating the networks into organized hierarchical networks

through mechanisms such as the Private Network-to-Network Interface ("PNNI") protocol used

20   in ATM or multimedia support for mobile wireless networks ("MMWM"). Thus, HLIM can be

implemented as long as the network nodes are connected in a hierarchy, physically or

virtually.